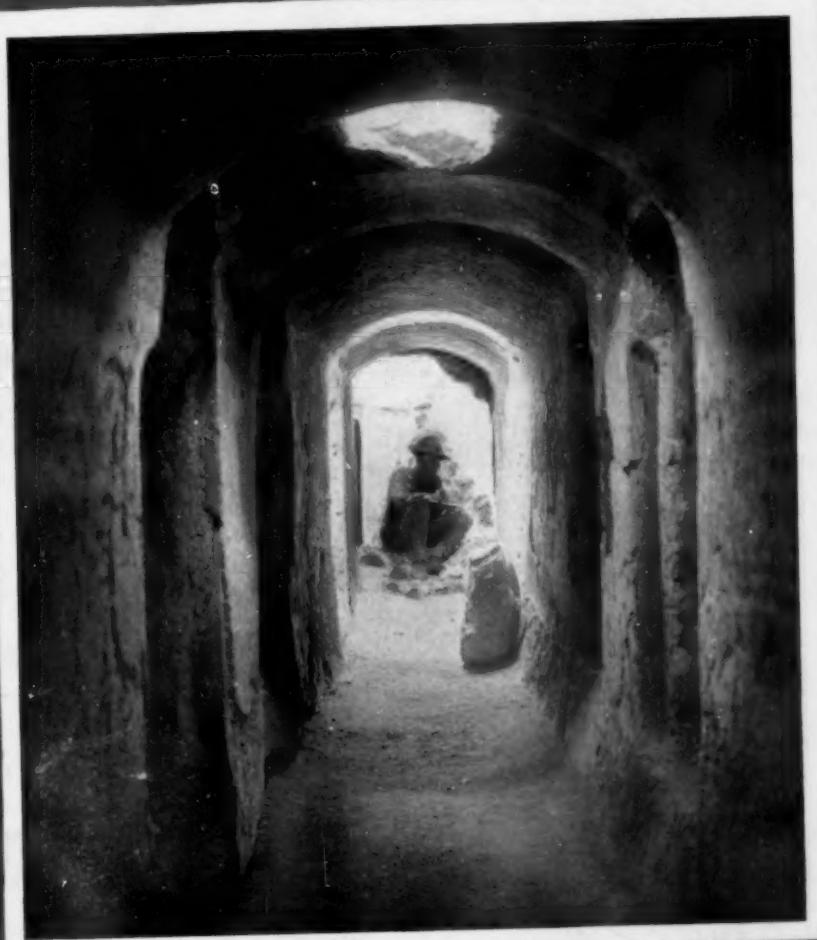


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



JANUARY 21, 1933

Where the Seven Sleepers Slept

See Page 41

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VOL XXIII

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Summary ofCurrent
Science

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DO YOU KNOW THAT?

About three-fourths of the food consumed in the United States is perishable.

A new idea for campers is a method of lighting fires with a form of crude rubber.

A bank check written in the raised Braille type used by the blind was recently presented and cashed at a New York bank.

Psychologists report that boy babies and girl babies cry about equally easily, and that the age of least crying is about four months.

Heliogabalus, Roman Emperor of the third century A.D., was roundly denounced for his extravagance in buying a whole garment of silk.

It is said that in the year 1249 fruit trees were forced and for the first time made to mature fruit in midwinter, in the Netherlands.

Bodies of ten black and brown horses, each killed by a blow on the head, were found in the grave of a Scythian king of about 1000 B.C., in the Altai Mountains.

Rubber goods can be easily cut with a knife if the blade is wet; for better qualities of rubber, soapy water may be necessary.

In experimental work, apple trees planted 40 feet apart yielded 43 bushels more fruit to the acre than trees planted 30 feet apart.

A Japanese geographer states that Japan may have reached the peak of her population increase, as the rate of increase has declined since 1927.

To find out how high and how far plant disease spores travel in the air, a government plant pathologist has been gathering spores from an altitude of 18,000 feet.

Pictures of Mayan gods, some older than 600 A.D., some made in the fifteenth century, show how very little the art and religion of these Indians changed in a thousand years.

A new drought-resistant and hardy strain of Korean lespedeza has been introduced from Manchuria, and seems likely to fill an important gap in New England and other northern pastures.

WITH THE SCIENCES THIS WEEK

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ARCHAEOLOGY

How long does legend say the seven sleepers slept? p. 41.

AVIATION

How would an airplane aerial be suspended to avoid ignition interference? p. 40.

AVIATION-PHOTOGRAPHY

Who will teach aerial photography at Harvard? p. 35.

BIOLOGY

Why do scientists study Daphnia? p. 38.

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Who won the Chandler medal for 1933? p. 46.

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What is the most common fault of automobiles? p. 41.

ENTOMOLOGY

Do full-grown moths eat clothes? p. 46.

Why were grasshoppers kept down last spring? p. 40. *The insect menace*—L. O. Howard—Century, 1931, \$3.50.

EXPLORATION

Name the vessel that made the first one-season voyage from Archangel to Japan. p. 37.

GEOGRAPHY

Where is "Vulcan's Throne"? p. 41.

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How is a possible gold deposit located by electricity? p. 41.

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How may iron stored in the liver be made available for body needs? p. 36.

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How long an exposure must be made to take a picture with hot flat-irons? p. 35.

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How did Joule heat water to determine the mechanical equivalent of heat? p. 42.

How may cosmic rays produce X-rays? p. 37.

What is happening to the back of one's head in the physicist's expanding universe? p. 37.

What is the latest atom to be smashed at Cavendish Laboratory? p. 37.

What part of total existing energy is cosmic radiation thought to be? p. 37.

PHYSIOLOGY

How does a severed nerve grow together? p. 43.

What glandular secretions may be useful in treating surgical shock? p. 36. *Glands in health and disease*—Benjamin Harrow—Dutton, 1922, \$2.50.

What is one keto, one, two, three, four tetrahydro phenanthrene? p. 43.

PUBLIC HEALTH

What was the maximum death-rate for the influenza epidemic? p. 40.

RADIO

What continent could talk with nearly all the rest of the world during business hours? p. 35. *Beginnings of telephony*—F. L. Rhodes—Harper's, 1929, \$4.

These curiosity-arousing questions will be especially valuable to the teacher. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publishers' prices, prepaid in U. S.

RADIO

New Ocean Phone Circuits To Bind Nations More Closely

Wire Connections Promise to Become Continental Links As Solutions Are Sought For Time and Language Barriers

IN THE BRIEF five years that have passed since the first commercial telephone circuit between Europe and North America was put in operation, great progress has been made toward the ideal of making it possible to talk from any telephone to any other telephone in the world.

The international telephone system is of importance to world understanding in the same sense that the postal system and the cable networks promote good will and commerce.

Telephone Cable Planned

There are now thirty-seven intercontinental telephone circuits totaling 168,000 miles in length. All of them are radio circuits, all but one operating on short waves. But plans have already been made to supplement the important route between Europe and North America with a telephone cable. Wire instead of wireless links between the continents promise to be important in the future.

At present the following ocean-bound areas can communicate directly with each other; North America and Europe, North America and South America, Europe and South America, Europe and Eastern Asia, Europe and Australia and Java, North America and Hawaii, Eastern Asia and Java. The Americas communicate with Australia and Java by way of Europe. Proposed direct connections to be established in the near future include links between North America and Eastern Asia and between Europe and South Africa.

Time Difference Difficulty

Some of the difficulties in intercontinental telephony are time differences and language barriers. Considering an eight-hour business day, for any city there is a third of the earth's surface on which the time is so different from that city that there is no overlap of the business day. Western United States has time differences of more than eight hours with a large part of Europe, Asia and Africa. Western Europe has few important centers in the world with which it cannot communicate within the

business day because the Pacific Ocean conveniently swallows the third of the world which would be inarticulate during European business hours. However, during the waking day there is an overlap of any two world points.

Neutral Language Needed

Often telephone operators at two distant world points cannot talk to each other directly, even if they are competent in several languages. The subscribers often have difficulty in conversing from distant localities because both may be using a language not their mother tongue. This causes the telephone engineers to strive to make standards of transmissions still higher in order that the difficulties of using unfamiliar languages may be minimized.

As world telephoning becomes more general, it may even be necessary to use some sort of neutral world language, like Esperanto, in the routine conversations between trans-continental operators. A relatively small vocabulary of several hundred words would probably suffice and this might be a powerful impetus to the adoption of an international auxiliary language.

Science News Letter, January 21, 1933

PHOTOGRAPHY

Invisible Light From Flat-Irons Takes Picture

AN EXCELLENT demonstration of how infra-red rays take pictures in the dark with a newly developed photographic emulsion is contained in the accompanying illustration. The lower view was taken in the usual way with visible light, while the upper picture was developed after an hour's exposure in total darkness. During this time the two electric irons were turned on but they did not glow as they appear to do in the picture. Infra-red rays that they gave off, closely associated with their heat radiation, were responsible for success.

The new emulsion was developed by

Eastman laboratories. With these negatives, photographs of groups of persons have been taken in the dark under a strong flooding of invisible infra-red light, and carbon dioxide has been discovered "with reasonable certainty" in the atmosphere of Venus through examination of photographs made by light from the planet.

Mt. Wilson Observatory reports that greater sensitivity to infra-red portions of the spectrum have made possible researches previously quite impractical, and have extended spectroscopy into a new and most important region.

Science News Letter, January 21, 1933

AVIATION-PHOTOGRAPHY

Aerial Photography Taught At Harvard University

GEOGRAPHY 36.

This is the prosaic title of a new course in aerial photography offered during the second half of the present school year at Harvard University. The instruction will be under the direction of four Army officers, Capt. A. W. Stevens, Capt. D. M. Reeves, Capt. B. C. Hill, and Lieut. J. F. Phillips, on leave from Wright Field, Dayton.

The latest photographic equipment, including a five-lens camera, will be used and plans are being considered for actual aerial work by students.

Science News Letter, January 21, 1933



FLASHED BY FLATIRON

PHYSIOLOGY

Vital Glands Preserve Life By Keeping Up Blood Volume

WHY THE CORTEX of the adrenal glands is of literally vital importance to the body has just been discovered by Drs. W. W. Swingle, J. J. Pfiffner and their associates, H. M. Vars, P. A. Bott and W. M. Parkins of Princeton University. In a report to *Science*, these investigators explain that the hitherto unknown function of the cortex of these small glands is to keep the blood up to normal volume.

When the hormone of the adrenal gland cortex is absent, due to injury or loss of the glands, fluid is continuously lost from the circulation. The result is that the body is unable to maintain its normal volume of blood and eventually death follows.

That the cortex of the adrenal glands is necessary to life has been known for some time. Addison's disease, due to injury to or disease of adrenal cortex, is fatal, but patients may be kept alive with extracts containing the powerful hormone of the adrenal cortex. Drs.

Swingle and Pfiffner were among the first to perfect such an extract, which has since been used to save the lives of sufferers from Addison's disease.

Now these investigators find that the function of the adrenal cortex is to maintain and regulate a normal circulating volume of fluid within the veins and other blood vessels. Their explanation is based on observations of blood pressure, blood volume, heart rate and similar conditions when little or no adrenal cortex hormone is being supplied to the body.

Shock, resulting from injury or surgical operations, may be explained in the same way as the results of lack of cortical hormone, and the symptoms of the two conditions are strikingly similar, it is pointed out. The Princeton investigators therefore suggest that in shock the adrenal glands are affected, and that this condition may be successfully treated by injections of adrenal cortex hormone.

Science News Letter, January 21, 1933

MEDICINE

Research Shows How Copper Aids Iron in Curing Anemia

THE PART which copper plays in curing anemia is shown by recent work of C. A. Elvehjem and W. S. Sherman of the University of Wisconsin. Four years ago these same workers helped Prof. E. B. Hart prove that copper as well as iron was necessary to raise the level of the hemoglobin in the blood when it had been lowered by milk diets. Even inorganic iron was found effective when a little copper was added.

The way in which copper achieves its function is now made clear.

When iron alone is fed to young rats that have been made anemic, the hemoglobin of their blood does not increase, but iron is stored in the liver and spleen in proportion to the amount fed. But if a little copper is added, then some of the stored iron is made available for the body needs, is converted into hemoglobin, the iron-containing pigment of the blood which enables it to carry oxy-

gen. If copper and iron are given together, the formation of hemoglobin takes place first and only the excess of iron is stored in the liver.

Thus copper is found to be necessary not for the assimilation of iron but for its conversion into hemoglobin so that it can be used by the body. Organic iron is just as ineffective as inorganic iron when copper is absent; in fact, even when copper is added, regeneration of blood is slower with organic iron than with inorganic. Plain ferric chloride gave five times as much storage of iron in the liver as did the complex hematin.

The old-fashioned carbonate of iron when combined with a little copper will prove of more help to sufferers from anemia than the more recent complex and expensive forms of iron. This should mean good news to both physicians and patients.

The anemia which is cured by cop-

per and iron is not pernicious anemia, but another type caused either by loss of blood or by inadequate diet.

Prof. Hart has just been granted a broad basic patent on inorganic compounds of iron and copper for the prevention and treatment of anemia. The patent has been assigned to the Wisconsin Alumni Research Foundation.

Science News Letter, January 21, 1933

MEDICINE

Pollen Extract Oxidized For Hay Fever Treatment

GOOD NEWS for hay fever sufferers appeared in a report to the Society of American Bacteriologists.

Some of these patients cannot be desensitized to the particular pollen that causes their trouble because hypodermic injections of the pollen extract may be followed by reactions of more or less severe nature. George E. Rockwell of the University of Cincinnati reported a method of treating such a pollen so that it would not give reactions and still would be potent to prevent fever.

Ragweed pollen, common cause of the affliction, was oxidized by treatment with hydrogen peroxide. The hydrogen peroxide was then removed by the use of platinized asbestos. This oxidized pollen extract gave little or no skin reaction when sensitive individuals were tested. It was used in the treatment of three hay fever subjects. There were no reactions, so the dosage could be increased much more rapidly than would have been possible with regular ragweed pollen extract. The clinical results were very satisfactory.

Science News Letter, January 21, 1933

ANTHROPOLOGY

Man Has Too Much Brain And Not Enough Jaw

DENTAL degeneration is undermining the health of modern man, who seems to have more brain and less jaw than he needs. This is the opinion Dr. E. A. Hooton, Harvard University professor of anthropology, voiced in an address to Harvard dental students.

"Human evolution is largely a matter of brain expansion and jaw reduction," Dr. Hooton explained. "It has reached a stage where we now have bigger and possibly better brains than we can use, and smaller and worse jaws than the health of the individual and the preservation of the species demand."

Science News Letter, January 21, 1933



NEW WONDERS FOR TOURISTS

Ice-laden sea photographed from the deck of the Soviet ice breaker Sibiriakov on its epochal voyage from Archangel to Japan through the Arctic ocean, which was accomplished in six weeks during the past season. This is the first time a vessel has completed this passage in one season. The ship's propeller broke twice, forcing the Sibiriakov to make the last stages of the voyage under crudely improvised sail.

PHYSICS

Einstein Backs Lemaitre Idea That Cosmic Rays Are Birth Cries

PROF. ALBERT EINSTEIN has given his scientific blessing to the ingenious theory proposed by Abbé Georges Lemaitre that cosmic rays are birth cries of the universe and the radiations from the super-radioactive primeval matter that existed when the universe was young.

Abbé Lemaitre, the young Belgian priest-cosmologist, first proposed this idea of cosmic ray origin in 1931. He has now expounded it to Pasadena, Calif., scientists with Prof. Einstein in his audience.

The father of relativity commented upon the Lemaitre "birth cries of the universe" theory by saying that "if matter is shortlived Lemaitre's theory is inevitable" and that besides no other theory agrees so well with all observations.

Abbé Lemaitre declared that cosmic radiation contains a thousandth of the total existing energy. He views the commonest elements as analogous to alpha rays that are emitted by radium.

The difference of interpretation of the nature of cosmic rays existing between Dr. Robert A. Millikan and Dr. A. H. Compton was touched upon by Abbé Lemaitre. He explained that beta particles or electrons must show latitude ef-

fect which, moreover, seems to exist. This upholds the Compton idea. But Abbé Lemaitre added that experiment shows that a preponderance of cosmic rays consists of photons or radiations like light rays. This upholds the Millikan idea.

The original energies of the "universe's birth cries" radiation have been greatly degraded by the red-shift effect, Abbé Lemaitre explained. This is the effect that when observed in the spectra of the far-distant nebulae indicates that the universe is expanding at a tremendous rate. Abbé Lemaitre was the first to enunciate the expanding universe theory later sponsored by De Sitter, Einstein and other "universe makers."

The essential fact of the sort of elliptical space that physicists and astronomers now visualize mathematically is that the object farthest from the observer is the back of his head, Abbé Lemaitre declared in a lecture. And in an expanding universe such as Prof. Lemaitre postulates on the basis of astronomical observations, the back of the observer's head is receding from him at an enormous rate.

In a billion years all the nebulae will have receded beyond the reach of tele-

scopes, Prof. Lemaitre said. Radioactivity will have become a legend. Similarly other radioactive processes may have died out in ancient time so that man can never know of them.

Science News Letter, January 21, 1933

PHYSICS

Boron Atom Smashed By British Physicists

BORON is the latest chemical atom to be smashed at the famous Cavendish Laboratory, Cambridge, England, by Drs. J. D. Cockcroft and E. T. S. Walton, who last year smashed lithium in a similar manner with a release of atomic energy.

Bombarding boron atoms with speedy hydrogen atomic hearts, they obtained electrically charged helium atomic hearts or alpha particles. Twenty-five times the number of helium atoms were obtained from the boron bombardment than had previously been obtained with lithium. But as yet the atom smashing is not a useful process in a practical way since roughly only one alpha particle is emitted for every two million proton hydrogen hearts flung at the boron by an electrical potential of 500,000 volts.

The Cambridge physicists wrote to *Nature*: "The ionization produced by the particles suggests that they are alpha-particles and the energy of the main group would support the assumption that a proton enters the boron nucleus (of atomic mass eleven) and the resulting nucleus breaks into three alpha-particles."

Science News Letter, January 21, 1933

PHYSICS

X-Rays Made As Cosmic Rays Plow Through Gas

A NEW PROCESS of X-ray generation, caused by the passage of a swiftly moving electrified particle through gas, has been reported to the American Physical Society by Dr. Gordon L. Locher, National Research Fellow at the Bartol Research Foundation of the Franklin Institute.

Dr. Locher discovered the new process of ionization while investigating the nature of the cosmic rays.

Part of the charge in an ionization chamber such as used for measuring the cosmic radiation is caused by characteristic X-radiation generated by the passage of the cosmic radiation particle through it, according to Dr. Locher's new theory.

Science News Letter, January 21, 1933

BIOLOGY

A Lady Who Keeps No Secrets

Daphnia's Lack of Reticence, Even About Her Innermost Personal Affairs, Makes Her Very Useful to Scientists

By DR. FRANK THONE

DAPHNE, the mythology books tell us, was a nymph. Like all the lovely creatures of her kind, she never troubled herself over-much about dress. Yet she had her own notions about privacy, her own reticences. One day Apollo saw her, and promptly gave chase, most ardently. When she saw he was about to overtake her, she implored Jupiter to help her. The Lord of Olympus took pity on her and changed her instantly into a laurel bush. And an armful of scratchy branches was all poor Apollo got for his pains.

About Daphnia, the modern zoological namesake of this beautiful unlucky nymph, the story is quite different. Aside from the fact that she also lives in the water, Daphnia is as little like Daphne as can well be imagined. What imp of irony was in the brain of the great Linnaeus when he chose the slim, graceful, modest nymph to be the patroness of a pudgy-figured, jerky little microscopic relative of the crayfish and the lobster, it is hard to guess.

Daphnia is unlike Daphne even in her notions of what to conceal. Even though Daphne did go about undraped, until she finally clothed herself once and for all in bark and leaves, she at least kept her internal affairs to herself. Daphnia has no such reticence as this. She is so completely without secrets that anyone who cares to put her under a microscope can examine in minute detail her heart and nerves and indeed her whole Department of the Interior. Daphnia is a lady completely without secrets.

And therein lies her usefulness to science. Daphnia is a microscopic water-animal, that breeds in millions in summertime ponds and puddles, and is eaten in millions by little fish that in turn are eaten by bigger fish. Daphnia thus performs a very useful work in the food-cycle of the world. She also performs a very useful work in the world's slow process of acquiring knowledge, for Daphnia is a favorite study-creature with zoologists, because her body is so

transparent that they can see every organ in it and watch the operation of her life-processes without the toilsome and messy job of dissecting her.

And she doesn't mind being studied, either. She is so tiny that lying in a drop of water under a microscope gives her no discomfort, and a half-pint milk bottle is as spacious a home for her as the Empire State Building would be for a single human being. So in a shelf-full of small bottles a scientist can keep a huge population of Daphnia sisters.

Trying It on Daphnia

One of the things that can be done with Daphnia, to the benefit of the science of physiology and the art of medicine, is the study of the effect of drugs. Having the same essential organs as a human being, but having them on view at all times, she offers an excellent chance to try out numbers of things that we may want to swallow ourselves later on, for the regulation of our own vital machinery.

This does not mean that the effects of drugs on Daphnia will be exactly duplicated in our own insides. After all, the kinship between man and Daphnia is of the remotest. But at least one can drop a little digitalis in the water she swims in, and watch what effect it has on her transparent little heart. Then one can try a little more digitalis, from a second lot to be analyzed, and again watch her heart. The difference between the two records will give some line on the difference between the strengths of the two drug samples. This method of "assay by Daphnia" attracted some notice recently in the public press, where Daphnia was referred to as a "flea." "Water-flea" is one of her common names, given partly because of her round, flea-like shape, partly because of her method of moving about in jumps and jerks, like a flea.

In such studies as this, it would be most desirable to take photographs, and even motion pictures. But here Daphnia baffled research until lately. She did so not by interposing obstacles but by interposing no obstacles. She is so transparent that she casts next to no shadows

at all on a photographic plate; and where there is no contrast of light and shade there can be no photograph. It is as though Daphnia were showing her mythical namesake Daphne that there is more than one way of defeating the searching fingers of the sun-god. By interposing no obstacles at all, Daphnia lets him slip by, baffled.

But Daphnia's photographic elusiveness has met its countercheck in the ingenuity of a German scientist in Prague, Dr. Josef Gicklhorn, of the Zoological Institute. He was interested, too, in the question of reactions to drugs, but to drugs of a particular kind: the so-called vital stains.

There are certain dyes that will color particular tissues or organs of plants or animals, and leave others uncolored or at most very faintly stained. Some of these, like salvarsan, are of great medical importance; others are of less direct use, but serve a purpose in revealing the relationships and origins of various parts of the body. This paves the way for later practical advances by laying a solid theoretical foundation.

Dr. Gicklhorn was interested in both



DAPHNIA'S INVESTIGATOR

Dr. A. M. Banta, Carnegie Institution researcher into the life story of Daphnia. The bottles are community dwellings that house colonies of the little animals.

these aspects of vital stain technique, and he chose Daphnia for his principal research animal because of her beautiful transparency, checking up his results on such creatures as frogs and guinea pigs, which are more nearly related to man but which are larger, more expensive to obtain, house and feed, and must be killed and dissected to see how a stain is working inside them.

Interior Decorations

He found, among other things, that his stains could pick out not only special organs in the body, but special cells or groups of cells in an organ, according to their chemical affinity for these tissues, leaving closely neighboring regions quite unstained. He found also that the same stain that "takes" in a given organ in Daphnia "takes" also in the analogous organ in a "higher" animal: a stain that colors her kidneys, for example, colors also the kidneys of snails, insect larvae and frogs.

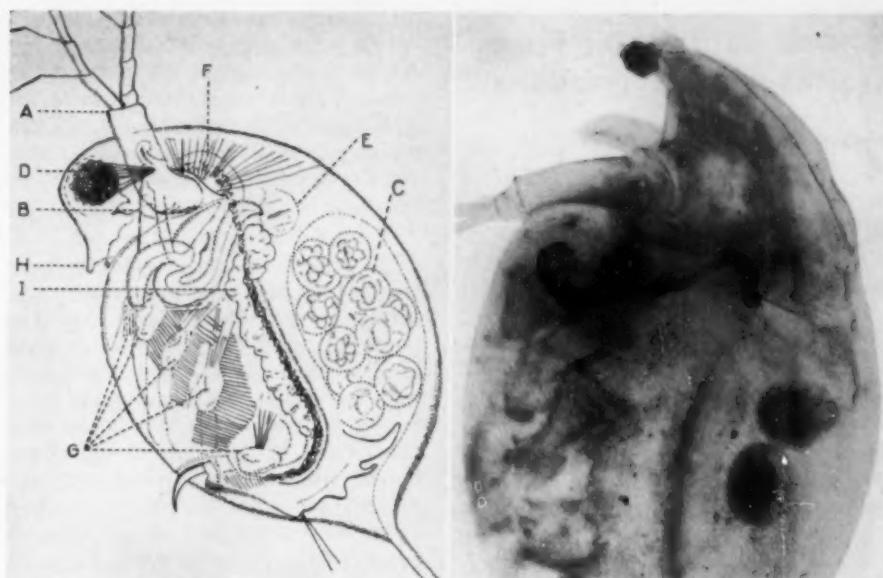
Another thing that Daphnia showed the German physiologist was that the intensity and speed with which a vital stain takes hold depends mainly on the intensity of function of the organ concerned. Thus healthy parts stain more quickly than sick ones; young animals react more strongly and more quickly than old.

Normal, healthy organisms always give a typical picture with vital stains, he discovered. And when an animal is beginning to get sick, it shows it in the stain-reaction more quickly than it does in its general behavior and appearance.

And the beauty of all Dr. Gicklhorn's chemical researches on Daphnia was that they automatically made her photographable. He has been able to obtain a considerable number of good pictures of her secrets hitherto quite beyond the reach of the camera and only faintly readable to the searching eye of the scientist himself.

Daphnia has been questioned for other biological secrets than those of physiological reactions to drugs and dyes. Dr. A. M. Banta, a research worker at the station for experimental evolution which the Carnegie Institution of Washington maintains at Cold Spring Harbor, Long Island, has learned from her a number of interesting and potentially important facts about heredity, evolution and sex.

Daphnia is especially useful from Dr. Banta's point of view because she seldom bothers with a male mate, being



THE LADY HERSELF, SKETCHED AND PHOTOGRAPHED

Study of Daphnia through the microscope has enabled scientists to sketch the lady's internal arrangements in detail. The letter A indicates her antenna; B, the brain with optic ganglion; C, brood case with developing ova; D, eye; E, heart; F, intestine; G, legs; H, beak; and I, ovary. On the right is a microscopic photograph taken after Daphnia had put on sufficient make-up, by swallowing dyes, to stain her internal organs and make them visible through her transparent body.

able to bring forth numerous progeny all summer long by her unaided self. This ability of unmated females to produce young is not uncommon among the lower animals; it is known to biologists as "parthenogenesis," which is Greek for "virgin birth." It is, for example, the regular method of propagation during warm weather among aphids, or "plant lice."

"Just Like Her Mother"

An animal that propagates in this way is valuable to the student of heredity because the young inherit from only one parent, and thus the troublesome questions of possible hybrid origins of new traits, that plague geneticists dealing with biparental animals or plants, do not enter in. One of the things Dr. Banta has observed in his swarms of Daphnias is the sudden appearance of quite new forms, that thereafter breed true.

Another very interesting thing Dr. Banta has learned from Daphnia is a way to control the sex ratio among offspring. For though Daphnia disdains the company of a mate during the summer, she does become the mother of sons as well as daughters as autumn advances, and the eggs that carry the species through the winter are the result of their mating. Dr. Banta learned that the number of males in the progeny of a female is directly depend-

ent on the slowing-down of her physiological processes. Daphnias that live "fast" have few or no sons; only daughters. Those that live "slow" will have from 35 to 100 per cent. male offspring.

This was discovered first as a result of a "crowding" experiment. Dr. Banta took two bottles of equal size. In one he put ten females, in the other only one. The solitary Daphnia produced no males at all; the crowded ones produced many. Then he tried the effects of chemicals that would slow down the metabolism, or body processes. Under the effects of these chemicals even uncrowded females produced male offspring. As a check on this, he took two "crowded" bottles, left one untreated, added a stimulant to the second. The females in the untreated bottles reacted normally, producing males. Those in the "stimulated" bottles, despite their crowding, gave birth to daughters almost exclusively.

Possible applications of this principle to sex-ratio control in higher animals and man are not yet in order. But at least Daphnia must be credited with an assist in the difficult game which scientists have long been trying to win: determining in advance whether it will be boy or girl.

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MEDICINE

Anemia Patients Die From Not Keeping up Treatment

THE LIVES of fifteen pernicious anemia patients were lost because of failure to keep up treatment with liver or liver extract, the annual report of President Alexander G. Ruthven of the University of Michigan showed.

Of 290 patients studied at the Simpson Memorial Institute of the university, 24 died during the year covered by the report. Twelve of these patients died of spinal cord degeneration, a condition frequently accompanying pernicious anemia. In a majority of the cases, the patients had discontinued the advised treatment, often over a long period. Nine died of accidents or diseases wholly unrelated to pernicious anemia. Three died of bronchopneumonia.

These three deaths and those from spinal cord degeneration could have been prevented, had the patients cooperated early and sincerely in the prescribed treatment with liver and ventulin, stated Dr. Cyrus C. Sturgis, director of the institute.

Science News Letter, January 21, 1933

AVIATION

Airplane Radio Freed From Ignition Interference

AMETHOD of eliminating radio interference caused by an airplane's own engine is covered in a U. S. patent (1,893,287) granted recently to C. Francis Jenkins, Washington inventor who holds many patents on television and motion pictures.

"It has been customary," Mr. Jenkins explained, "to suspend a wire under the plane with a lead weight, a 'lead fish' attached to the free end thereof to hold it steady, and as nearly vertical as possible; or to fasten the antenna to a vertical mast carried by the plane. Antennae have also occasionally been fastened along the leading edge of the wings and from the wing tip to tail structure."

"All such antennae locations have serious interference from engine ignition radiation. For this reason costly shielding of the magnetos, the spark plugs and high tension leads must be employed to avoid ignition noises in the exposed antenna preventing voice reception aboard the plane, and seriously interfering with code reception."

Mr. Jenkins found that electrical high-tension radiation from the engine ignition system is spherically radiated,

and envelops the plane, and by exploration he has discovered that a radiation-free zone exists aft of the plane which probably results from absorption by the metal parts of the plane fuselage creating an electrical cone-shaped shadow free of interference behind the plane spreading out from a point directly behind the engine.

The Jenkins invention therefore holds the antenna axially in this zone by unreeling the antenna and permitting it to fly aft from the tail structure. A small celluloid ball or balsa-wood "fish" is attached to the end of the antenna so as to keep it horizontally taut in the electric shadow in the wake of the plane. The antenna in this position does not pick up any radiation from the ignition system of the engine.

Science News Letter, January 21, 1933

PUBLIC HEALTH

Influenza Deaths Threaten 1932 Good Health Record

DEATHS during the closing weeks of 1932, banner health year, increased in 85 cities of the country, due to the outbreak of influenza. The average death-rate for these cities increased from 11 per thousand for the first week of December to 14.7 per thousand for the week ending December 31.

During the corresponding period of 1931 and 1930, the death-rate was 11.5 per thousand. However, in the closing weeks of 1928 and the first ones of 1929, when the last influenza epidemic occurred, the death-rate rose from 12.6 early in December to 18 at the height of the epidemic. It is still too early for health authorities to know whether the increase will have a marked effect on the general health record for 1932, which, up to the outbreak of influenza, was remarkably good.

Influenza is now decreasing throughout the country, both in the number of cases and in the number of deaths, reports received at the U. S. Public Health Service indicate.

For the week ending January 7, the latest for which figures are available, 72,241 cases were reported. This is almost twenty thousand less than the previous week's total. Deaths for 85 cities of the country have also decreased from the year-end high of 14.7 per thousand to 13.6.

While the epidemic is not yet over, no more great rise in the number of cases is expected.

Science News Letter, January 21, 1933

IN SCIE

ENTOMOLOGY

Grasshopper Menace Diminished in West

GRASSHOPPERS will not cause major crop damage in the West during the coming summer, unless unexpected weather conditions favoring them should occur. This is predicted as a result of the annual grasshopper survey of the bureau of entomology of the U. S. Department of Agriculture. The field research men of the bureau examine the soil in trouble-promising areas, counting grasshopper eggs and judging as well as they can the climatic conditions that favor or hinder their development when warm weather returns.

In only one state, North Dakota, is the egg count higher than it was in the fall of 1931, though there are local "bad spots" in a number of other states. In these places the farmers may again have to spread poison bran bait for the young 'hoppers, unless a cool, moist spring favors the development of parasites and fungus diseases and thus keeps the insects down by natural means.

The droughty summers of 1930 and 1931 favored the development of large numbers of grasshoppers, but the long, wet, somewhat chilly spring of last year tilted the balance in favor of the grasshoppers' enemies.

Science News Letter, January 21, 1933

CHRONOLOGY

One P. M. Would be 13 o'Clock to Royal Mail

THE TIME designations of a. m. and p. m. will be obsolete and the hours run from 0 to 24 in British post offices if a proposal before the House of Lords finds approval. The movement for continuous numeration of the hours has the support of Sir F. W. Dyson, the astronomer royal, who says that there is no valid objection to the 24 hour system which is less confusing and has been in use on the European continent for a long time. Astronomers and other scientists already use the 24-hour notation, with 0 at midnight and 13 o'clock corresponding to old-fashioned 1 p. m.

Science News Letter, January 21, 1933

EE FIELDS

GEOGRAPHY

New National Monument Near Grand Canyon

A NEW national monument has been set apart on the Grand Canyon of Arizona, about fifty miles down-river from the point in Grand Canyon National Park now most visited by tourists. The new area, which will be known as Grand Canyon National Monument, comprises a total of 392 square miles, and has one magnificent vantage-point from which one can look down on the Colorado, winding its way at the bottom like a silvery ribbon. From most points on the rim in the present Grand Canyon National Park the river is quite invisible.

Another feature of the new National Monument is a volcanic cone, thrown up in some long-past time and now wholly extinct. It bears the imposing name of "Vulcan's Throne."

Science News Letter, January 21, 1933

ENGINEERING

Four-Fifths of All Autos Indicated as Dangerous

SEVENTY-NINE per cent. of all automobiles in operation are so out of repair that they are dangerous on the highway.

This interpretation might be put on the results of an examination of 2,134 cars voluntarily submitted to Prof. R. A. Moyer, highway engineer at Iowa State College, Ames, Iowa. Since the cars had an average age of about three years and mileage of 30,000, they were considered to be average automobiles.

The most common fault Prof. Moyer found was in distribution of braking power. Of 1,686 cars failing to pass the test, 45 per cent. had poor distribution of braking power. Prof. Moyer rejected cars for this fault when there was a variation of 40 per cent. or more between braking power of the front or of the rear wheels.

Bad headlights, in which the beam of light was elevated too high, were found on 42 per cent. of the total. Twenty-three per cent. of the cars had no stop

lights, or had stop lights which were not in working order. Headlights on 18 per cent. were out of focus, while 12 per cent. had no headlight dimmers.

Front wheels of 13 per cent. were found to be out of line, a fairly common cause for accidents, according to Prof. Moyer. Rear wheels were found out of alignment on two per cent.

Seven per cent. of the cars tested had no parking lights, and tail lights did not work on six per cent. No windshield wipers were found on four per cent.; steering gears were loose on three per cent.; horns were missing or did not work on two per cent.; headlight power was weak on two per cent.; tires were worn smooth on two per cent.; while another two per cent. had no rear vision mirrors.

Science News Letter, January 21, 1933

GEOPHYSICS

Underground Gold Sought By Electrical Method

GOLD has recently become an object of search by the geophysicist, who, by manipulating electrical devices on the surface, is able to tell where wealth is likely to be found far underground.

The latest developments of geophysical instruments make the search for gold-bearing quartz veins possible, Sherwin F. Kelly, consulting geologist and geophysicist, reported to the Science Forum of the New York Electrical Society.

"Heretofore," Mr. Kelly explained, "variations in the electrical resistance of rock and soil above suspected quartz have masked the very slight differences in resistance between quartz veins and the enclosing rock. Improvements now make it possible to eliminate these surface variations and thus unmask the slight variations in electrical effect of the underlying material."

He cautioned that it is still impossible to tell whether or not the quartz contains gold. The method should only be applied, it was pointed out, in regions where quartz veins are known to be gold-bearing as an intermediate stage between the first geological reconnaissance and diamond drilling.

Mr. Kelly also described methods that have been used to locate other forms of gold deposits. Placer deposits have been found magnetically because they are often accompanied by so-called black sands, consisting of particles of magnetic iron ore, he said.

Science News Letter, January 21, 1933

PHYSICS

Cosmic Rays May Be Born of Neutral Rays From Stars

A NEW THEORY of the origin of cosmic rays has been suggested to the American Physical Society by Dr. Ross Gunn of the U. S. Naval Research Laboratory, Bellevue, D. C.

Out in the stars that are still young there are born in great "star-spots," like sunspots on our sun, negatively charged ions or electrons which are given great energies. These pass through the outer layers of the star and each picks up a positive ion, and the two together form an energetic neutral pair of some 10 to 100 thousand million electron volts. When such particles hit the earth they become separated in the upper atmosphere by electromagnetic forces or collisions and become the cosmic rays.

Such neutral pair particles which are fathers to cosmic rays are uniformly distributed in space, Dr. Gunn believes, thus accounting for the cosmic radiation coming from all directions. The sunspots give rise to weaker neutral radiation which gives rise to the aurorae and magnetic storms but are not powerful enough to generate cosmic rays, Dr. Gunn's theory holds.

Science News Letter, January 21, 1933

ARCHAEOLOGY

Seven Sleepers' Catacombs Explored by Archaeologists

See Front Cover

ONE OF THE most venerable of Christian legends, running back through the middle ages into late antiquity, is that of the Seven Sleepers of Ephesus; seven youths who hid themselves from the persecution of a pagan Roman emperor, and awoke two hundred years later to find the empire Christian. Then, the story continues, they joyously went to sleep again.

Although the sleeping place of the seven young men is indicated as a cave in the usual version of the legend, there is a catacomb in Ephesus in Asia Minor which is also known by their name. Perhaps it was dedicated to them by a later generation, or it may be an older catacomb that was renamed in their honor. During recent months this "Catacomb of the Seven Sleepers" has been opened up and explored by a European archaeological expedition, in the course of a comprehensive excavation of this famous city of classical and New Testament antiquity.

Science News Letter, January 21, 1933

PHYSICS

The Mechanical Equivalent of Heat

"A Classic of Science"

**Joule Startled the 1845 British Association Meeting
By Declaring That Heat Can Be Measured in Foot Pounds**

THE SCIENTIFIC PAPERS OF JAMES PRESCOTT JOULE, Published by the Physical Society of London. London: 1884. The following are exact reprints of the original publications.

ON THE MECHANICAL EQUIVALENT OF HEAT. By James P. Joule. Brit. Assoc. Rep. 1845, Trans. Chemical Sect. p. 31. Read before the British Association at Cambridge, June, 1845.

THE AUTHOR gave the results of some experiments, in order to confirm the views he had already derived from experiments on the heat evolved by magneto-electricity, and from experiments on the changes of temperature produced by the condensation and rarefaction of elastic fluids. He exhibited to the Section an apparatus consisting of a can of peculiar construction filled with water. A sort of paddle-wheel was placed in the can, to which motion could be communicated by means of weights thrown over two pulleys working in contrary directions. He stated that the force spent in revolving the paddle-wheel produced a certain increment in the temperature of the water; and hence he drew the conclusion that when the temperature of a pound of water is increased by one degree of Fahrenheit's scale, an amount of *vis viva* is communicated to it equal to that acquired by a weight of 890 pounds after falling from the altitude of one foot.

The Experiments

ON THE EXISTENCE OF AN EQUIVALENT RELATION BETWEEN HEAT AND THE ORDINARY FORMS OF MECHANICAL POWER. By James P. Joule, Esq. (In a letter to the Editors of the "Philosophical Magazine"). Phil. Mag. Ser. 3, Vol. XXVII.

Gentlemen:

The principal part of this letter was brought under the notice of the British Association at its last meeting at Cam-

bridge. I have hitherto hesitated to give it further publication, not because I was in any degree doubtful of the conclusions at which I had arrived, but because I intended to make a slight alteration in the apparatus calculated to give still greater precision to the experiments. Being unable, however, just at present to spare the time necessary to fulfill this design, and being at the same time most anxious to convince the scientific world of the truth of the positions I have maintained, I hope you will do me the favour of publishing this letter in your excellent Magazine.

The apparatus exhibited before the Association consisted of a brass paddle-wheel working horizontally in a can of water. Motion could be communicated to this paddle by means of weights, pulleys, &c., exactly in the manner described in a previous paper.¹

The paddle moved with great resistance in the can of water, so that the weights (each of four pounds) descended at the slow rate of about one foot per second. The height of the pulleys from the ground was twelve yards, and consequently, when the weights had descended through that distance, they had to be wound up again in order to renew the motion of the paddle. After this operation had been repeated sixteen times, the increase of the temperature of the water was ascertained by means of a very sensible and accurate thermometer.

A series of nine experiments was performed in the above manner, and nine experiments were made in order to eliminate the cooling or heating effects of the atmosphere. After reducing the result to the capacity for heat of a pound of water, it appeared that for each degree of heat evolved by the friction of water a mechanical power equal to that which can raise a weight of 890 pound to the

¹Phil. Mag. ser. 3, vol. xxiii, p. 436. The paddle-wheel used by Rennie in his experiments on the friction of water (Phil. Trans. 1831, plate xi, fig. 1) was somewhat similar to mine. I employed, however, a greater number of "floats," and also a corresponding number of stationary floats, in order to prevent the rotatory motion of the water in the can.



JAMES PRESCOTT JOULE
1818-1889

height of one foot had been expended.

The equivalents I have already obtained are:—1st, 823 lb., derived from magneto-electrical experiments; 2nd, 795 lb., deduced from the cold produced by the rarefaction of air; and 3rd, 774 lb., from experiments (hitherto unpublished) on the motion of water through narrow tubes. This last class of experiments being similar to that with the paddle-wheel, we may take the mean of 774 and 890, or 832 lb., as the equivalent derived from the friction of water. In such delicate experiments, where one hardly ever collects more than half a degree of heat, greater accordance of the results with one another than that above exhibited could hardly have been expected. I may therefore conclude that the existence of an equivalent relation between heat and the ordinary forms of mechanical power is proved; and assume 817 lb., the mean of the results of three distinct classes of experiments, as the equivalent, until more accurate experiments shall have been made.

Any of your readers who are so fortunate as to reside amid the romantic scenery of Wales or Scotland could, I doubt not, confirm my experiments by trying the temperature of the water at the top and at the bottom of a cascade. If my views be correct, a fall of 817 feet will of course generate one degree

of heat and the temperature of the river Niagara will be raised about one fifth of a degree by its fall of 160 feet.

Admitting the correctness of the equivalent I have named, it is obvious that the *vis viva* of the particles of a pound of water at (say) 51° is equal to the *vis viva* possessed by a pound of water at 50° plus the *vis viva* which would be acquired by a weight of 817 lb. after falling through the perpendicular height of one foot.

Assuming that the expansion of elastic fluids on the removal of pressure is owing to the centrifugal force of revolving atmospheres of electricity, we can easily estimate the absolute quantity of heat in matter. For in an elastic fluid the pressure will be proportional to the square of the velocity of the revolving atmospheres, and the *vis viva* of the atmospheres will also be proportional to the square of their velocity; consequently the pressure will be proportional to the *vis viva*. Now the ratio of the pressures of elastic fluids at the tem-

peratures 32° and 33° is 480: 481; consequently the zero of temperature must be 480° below the freezing-point of water. We see then what an enormous quantity of *vis viva* exists in matter. A single pound of water at 60° must possess $480^{\circ} + 28^{\circ} = 508^{\circ}$ of heat; in other words, it must possess a *vis viva* equal to that acquired by a weight of 415036 lb. after falling through the perpendicular height of one foot. The velocity with which the atmospheres of electricity must revolve in order to present this enormous amount of *vis viva* must of course be prodigious, and equal probably to the velocity of light in the planetary space, or to that of an electric discharge as determined by the experiments of Wheatstone.

I remain, Gentlemen,
Yours respectfully,
JAMES P. JOULE.

Oak Field, near Manchester,
August 6, 1845.

Science News Letter, January 21, 1933

fibers in the transparent tissues of a frog tadpole's tail. During the past year he has also been studying nerve fiber growth in salamanders, which are rather remote zoological cousins of the frogs. He finds that the growth process in this order of animals is essentially the same as those he observed in the tadpole tails.

Science News Letter, January 21, 1933

PHYSIOLOGY

First Step Taken Toward Synthetic Sex Hormone

THE FIRST STEPS toward making a female sex hormone in the chemical laboratory seem to have been taken by two British investigators, Dr. J. W. Cook of the Cancer Hospital and Dr. E. C. Dodds of the Middlesex Hospital, London.

These two scientists have produced a chemical compound which, when injected into castrated rats, has an appreciable oestrogenic action similar to that of the sex hormone, oestrin. In their report to *Nature*, Drs. Cook and Dodds give the following formula for their compound: one keto, one, two, three, four tetrahydro phenanthrene.

Phenanthrene is a coal tar product used in the artificial production of dyes and drugs. The rest of the new compound's long name tells the chemist the way in which additional hydrogen and oxygen are combined with the phenanthrene.

At least four female sex hormones have been reported in recent years from research centers in the United States, Canada, England and Germany. They have been obtained from human placental material and from the kidney secretions of expectant mothers. These substances appear to be the same chemically, but they differ somewhat in the effects they have on the animal body.

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PHYSIOLOGY

Motion Pictures Made of Growing Nerve Fibers

MOTION PICTURES demonstrating how nerve fibers grow through living tissue, and how they repair themselves when injured, have been made by Prof. Carl C. Speidel of the University of Virginia. Prof. Speidel was the winner of the \$1000 prize of the American Association for the Advancement of Science at the midwinter meeting at New Orleans last year. A recent report to the Association summarizes his work up to that time and describes advances made since then.

As pictured and explained by Prof. Speidel, nerve growth is pioneered by what are known as "growth cones" on the ends of the nerve fibers. These are thickenings of the tips, which probe their way through the tissues, constantly sending out and retracting tiny processes from their surfaces, like finger-tips feeling their way. As the nerve progresses, special cells develop along its course. They hug its sides closely, though they take no part in its actual growth process, nor in its function as a nerve. These are known as the "sheath cells." Finally, as the nerve becomes more mature, it develops around itself a layer of fatty material called the "myelin sheath."

All these developments were shown in the motion picture. In life, the growth process is rather slow, but by taking only one picture in two seconds and then projecting them at normal movie speed of sixteen to the second, the apparent rate of growth was speeded up 32 times. Another portion of the film was taken at the rate of one frame in eight seconds, giving them a speeding-up effect on the screen of 128 times the natural rate.

Growth after injury, as well as normal growth, was studied by Prof. Speidel. It has long been a disputed point whether a severed nerve grew together again or started afresh from the cut end nearest the central nervous system. Evidence apparently supporting both views has been produced in the past. Prof. Speidel's studies showed that where the two cut ends apparently grew together again, there was an anastomosis, or anatomical detour, connecting them by another path. A cut end really quite separated from the central nervous system degenerates and disappears, and a new nerve fiber grows out to replace it.

Prof. Speidel's first studies were conducted by watching the growth of nerve

"...the Lion and the Lizard keep
The Courts where Jamshyd gloried
and drank deep."

CHARLES DARWIN

—explains in the next Classic of Science the part played by the humble earthworm not only in working over the garden soil but in burying the dead cities of antiquity.



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ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone



Clothes Moth

WHENEVER furs and woolens are brought out of home storage, comes one of the regularly recurring little crises of the housewife's year. Each piece must be anxiously inspected for holes or chewed places, and for the tell-tale little pupa cases in which the hungry marauders have lived. And woe to any small moth, whatever be its species, that flutters across the sight of the zealous guardian of the family's wearables. With a frantic swoop and a smacking of hands she encompasses the luckless insect's annihilation.

As a matter of fact, however, it doesn't do much good to kill flying moths. Most of them are not clothes moths anyway, and even those that are clothes moths are not themselves clothes-eaters. They only lay the eggs that hatch into wool-hungry "worms" or larvae.

According to investigators of the U. S. Department of Agriculture, many of the "moth-proofing" sprays are somewhat over-recommended by their manufacturers. The compounds used really will make things moth-proof, but in order to do so the fabrics or furs must be

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either soaked or steamed with them; mere spraying will not stop the attacks completely though it will in many cases reduce the likelihood of moth attack very materially. But the advertisers should not claim full moth-proofing from a sprayed application, say the government entomologists.

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CHEMISTRY

Chemical Award Recognizes Synthesis of Alcohol

THE CHANDLER MEDAL for 1933 has been awarded to Dr. George Oliver Curme, Jr., research director of the Carbide and Carbon Chemicals Corporation, New York, in recognition of his synthesis and large-scale production of many aliphatic chemical compounds, such as fatty acids, hydrocarbons, alcohols, esters and ethers.

Most striking was Dr. Curme's manufacture of synthetic ethyl alcohol, put into large scale production in 1930, thus competing seriously with the ancient process of making this ordinary alcohol from fermentation of grain or molasses.

The prize committee chairman, Prof. Arthur W. Hixson of Columbia, termed Dr. Curme "one of the greatest living exponents of aliphatic chemistry" and he declared that Dr. Curme "perhaps heads the list of those who have brought the

leadership in organic chemistry from Germany, where they hold uncontested lead in the aromatic field, to the United States, where the abundance of raw materials and independence of thought has permitted American chemists to strike out in entirely new directions."

Dr. Curme's original work, done in 1915-16, involved the production of acetylene, the thermo-decomposition of mineral oil induced by striking an electric arc beneath the surface of the oil.

Subsequently he has worked out practical methods for the production of ethylene glycol, ethylene dichloride, ethylene chlorhydrin, ethylene oxide, diethyl sulfate, dichlor ethyl ether and many other compounds. Most of this work has been patented and the company with which he is connected was organized to exploit it.

Dr. Curme's greatest achievement has not been solely the working out of laboratory methods for making these compounds, but in translating these laboratory applications to large scale manufacturing processes. Today the production of ethylene glycol, ethylene dichloride, ethylene chlorhydrin and some of the other compounds mentioned runs into many millions of pounds annually.

More recently his early work in connection with the production of synthetic isopropyl alcohol and acetone has been commercialized and these products are now available on a large scale.

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ENGINEERING-ECONOMICS

What to Read to Learn More About "Technocracy"

NOW THAT MOST members of the reading public are using the word "technocracy" in daily conversation, some of them may wish to dig into the book literature and make up their own minds about the menace or benefit of the machine age in relation to economics.

First there might be mentioned the new flock of books, some grinding through the presses, some on the bookshop shelves, that deal with "Technocracy" as advanced by the New York group of engineers and architects. Among these are: "The A.B.C. of Technocracy" by Frank Arkright (Harpers), "Towards Technocracy" by Graham A. Laing (Angelus Press), "Life in a Technocracy" by Harold Loeb (Viking Press), "Technocracy, An Interpretation" by Stuart Chase (John Day), "The Truth About Technocracy" by Walter B. Pitkin (Simon and Schuster), "What is Technocracy?" by Allen Raymond (Whittlesey House), "An Outline of Technocracy" by Wayne W. Parrish (Farrar and Rinehart).

For the background of Technocracy, and some say the source of its economic ideas, see: "The Engineers and the Price System" by Thorstein Veblen (Viking Press, 1921); "Wealth, Virtual Wealth and Debt" by Frederick Soddy (E. P. Dutton and Co. 1926).

For facts, figures and interpretations of the economic consequences of power and science in industry, read: "Recent Social Trends" by President Hoover's Committee (McGraw-Hill); "Recent Economic Changes," another Hoover



V The Science Service radio address next week will be on the subject

B PLANTS THAT FORM REEFS AND ISLANDS

by

D Dr. Marshall A. Howe

Assistant Director of the New York Botanical Garden

I FRIDAY, JAN. 27

at 12:45 P. M., Eastern Standard Time

O Over Stations of The Columbia Broadcasting System

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survey, 1929 (National Bureau of Economic Research and McGraw-Hill) and its supplementary volume just issued, "Economic Tendencies" by Frederick C. Mills (National Bureau of Economic Research); "The Paradox of Plenty" by Harper Leech (Whittlesey House); "Economic Consequences of Power Production" by Fred Henderson (Allen and Unwin, London).

If the problems entice, there is more mental fodder on civilization's predicament in the books by Sir Arthur Salter, John Maynard Keynes, Stuart Chase and others who have written on our economic problems in the last few years.

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GENETICS

Hybrid Macaw Developed "Throwback" Feathers

A CASE of hybridization in which the offspring did not show a combination of parental characters, but instead a reversion to an apparent ancestral pattern, has been reported to *Nature*.

In New Zealand, two macaws were mated. The male was a red-and-yellow bird, the female blue-and-yellow. When their young one grew its adult plumage, the feathers on the underside of the body were neither red nor blue, but a combination. This is what might be expected in a hybrid. However, its back feathers were neither red nor blue nor mixed, but bluish-green. This color appears on neither of the parents, but is the common back-color of the wild ancestral stock.

Science News Letter, January 21, 1933

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•First Glances at New Books

Mental Hygiene

BEHIND THE DOOR OF DELUSION—"Inmate-Ward 8"—Macmillan, 325 p., \$2. A patient in an insane asylum, a former newspaper man, has written the story of life in the institution and how he and his fellow inmates feel about it. The book is extremely interesting and the author paints a vivid picture of conditions as he finds them. These conditions no longer prevail in our more modern institutions, which are truly hospitals for mental disease, and not insane asylums. However, this does not detract from the value and interest of the book. An especially interesting chapter is the one on "the sterilization specter."

Science News Letter, January 21, 1933

Nature Study

NATURE RAMBLES, WINTER—Oliver P. Medsger—Warne, 160 p., \$2. With this volume, Mr. Medsger completes his cycle of seasonal nature books. Like their predecessors, the winter rambles are personally conducted, in a pleasantly informal manner. The addition of sections on California and Florida are well advised, for the benefit of Northerners who feel themselves lost in the western chaparral or the southern pine-lands.

Science News Letter, January 21, 1933

Zoology

AN INTRODUCTION TO ZOOLOGY—A. P. Metcalf—Thomas, 425 p., \$3.50. This new textbook presents zoology "right end foremost" from the point of view of the elementary student, beginning with vertebrates and laying particular stress on man and the rat. The style is compact and thorough without being dull, and the illustrations—even the anatomical ones—have an attractive liveliness about them.

Science News Letter, January 21, 1933

Biology

BIOLOGY—H. Munro Fox—Macmillan, 343 p., \$1.75. A brief, soundly gotten up introductory text by a leading English teacher and investigator.

Science News Letter, January 21, 1933

Botany

THE IDENTIFICATION OF CERTAIN NATIVE AND NATURALIZED GRASSES BY THEIR VEGETATIVE CHARACTERS—R. F. Copple and A. E. Aldous—Kansas State College, Experiment Station, 73 p., free. Most beginning botanists are a bit afraid of grasses. This is un-

fortunate, for they always live to regret it. This plainly written, clearly illustrated brochure (28 plates of line illustration) will do much to remedy this ill. The booklet will also be of very practical use to range managers and others having an interest in the commercial value of grasses.

Science News Letter, January 21, 1933

Photography

MEN AT WORK: PHOTOGRAPHIC STUDIES OF MODERN MEN AND MACHINES—Lewis W. Hine—Macmillan, 48 p., \$1.75. Our time is called the machine age, but the machines do not run themselves—modern men are required to operate as well as to make them. These are the characters of this drama pictured with exceptional skill at their daily tasks on skyscraper skeleton, in railroad cab or directing precision machinery. There is just enough text in big type properly to caption and carry on the theme of the book.

Science News Letter, January 21, 1933

Geography

GOODE'S SCHOOL ATLAS—J. Paul Goode—Rand, McNally, xvi+287 p., \$4. Maps of the world as it is today, lettered and colored for easy reading, and on projections that involve a minimum of that *bête-noire* of cartographers, distortion. Besides the usual maps of political divisions, topographic features, etc., there are many special ones showing climatic zones, economic areas, plant and animal distribution and numerous other things that formerly did not get into school atlases at all.

Science News Letter, January 21, 1933

Chemistry

PHYSICAL CHEMISTRY FOR STUDENTS OF BIOLOGY AND MEDICINE—D. I. Hitchcock—Thomas, 182 p., \$2.75. For a long time, students of biology and medicine had to take chemistry as the chemists chose to give it to them. This often meant an overload of material they did not especially want, and too little of some things they really needed. It is therefore fine to get a comprehensive yet not too bulky text like this.

Science News Letter, January 21, 1933

Mining

A HISTORY OF AMERICAN MINING—T. A. Rickard—McGraw-Hill, 419 p., \$3. Young mining engineers, who must of necessity get much of their experience second-hand from stories of the pioneers, may learn here the activities of those who made early mining history and have passed on. The casual reader will also find the book interesting and informative of a large section of that practically untouched field, the history of American engineering.

Science News Letter, January 21, 1933

Archaeology

THE ALISHAR HUYUK, SEASON OF 1927, Part II—Hans Henning von der Osten and Erich F. Schmidt—Univ. of Chicago Press, 134 p., \$5. The first part of the report on excavations at this important site in 1927 dealt with buildings and pottery. This second part deals with burials found there, and seals, figurines, and other small objects. The careful describing and figuring of these finds is valuable material for the task of reconstructing the successive cultures in the little-known region of the Hittite Empire. A chapter on the coins is written by Edward T. Newell.

Science News Letter, January 21, 1933

Archaeology

THE ALISHAR HUYUK, SEASONS OF 1928 AND 1929, Part I—Erich F. Schmidt—Univ. of Chicago Press, 293 p., 46 pl., \$12. In previous reports, the Oriental Institute announced the results of its 1927 excavations at this important mound in Anatolia. This report carries discovery forward through two more seasons. Seven strata of culture have been distinguished, showing occupation from about 3500 B.C. Dr. Schmidt's aim is to present the material from the site, so that it may furnish an archaeological scale or chronometer for future investigators in this heretofore little-known region. As is usual in these reports, the pottery, spindle-whorls and other objects are beautifully illustrated, some in color; so that the pictures offer fine material for study. Besides the plates, there are 377 text figures.

Science News Letter, January 21, 1933

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